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Thesis

THE ESTABLISHMENT OF A RELATIVE ORDER OF DIFFICULTY OF
WORD ELEMENTS IN AUDITORY DISCRIMINATION

by

Mary Virginia Biggy

(B.S. in Education, Boston University, 1945)

Submitted in partial fulfillment of the
requirements for the degree of

Master of Education

1946

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Sincere thanks and deep appreciation are extended to Dr. Helen A. Murphy, Assistant Professor of Education, Boston University School of Education, for permission to use her "Group Test for Auditory Discrimination" as a basis for this thesis. I am particularly grateful to her for the generous assistance and keen interest in the achievement of this experiment.

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MEMORANDUM

1. Subject	Report of the Committee on the Administration of the Government	10-11-1918
2. Purpose	To determine the feasibility of the proposed plan for the reorganization of the Government	10-11-1918
3. Scope	The report covers the period from the beginning of the year to the end of the year	10-11-1918
4. Method	The report is based on a study of the records of the Government and on interviews with the officials of the Government	10-11-1918
5. Results	The results of the study are as follows: (a) The proposed plan is feasible (b) The proposed plan is not feasible	10-11-1918
6. Conclusion	The proposed plan is not feasible	10-11-1918
7. Recommendation	The proposed plan is not feasible	10-11-1918
8. Action	The proposed plan is not feasible	10-11-1918

INTRODUCTION

Many children have difficulty in learning to read because they lack the ability to hear likenesses and differences in words.

The following study was undertaken in an effort to establish a relative order of difficulty of word elements in auditory discrimination.

Recent research studies tend to emphasize the importance of auditory discrimination as one of the skills necessary for a child to learn to read without confusion. Monroe^{1/} reported a correlation of .66 plus or minus .04 between reading achievement and scores on the auditory tests for reading readiness. This is a higher correlation than any other single score on the battery which includes visual, articulation, language, and motor tests. She also suggests after studying the influence of poor auditory discrimination upon reading defect cases^{2/} "that lack of precise auditory discrimination was found to impede the learning which involves auditory impressions. Lack of discrimination of certain sounds may lead to confusion of words, which in turn affects reading progress."^{3/} Murphy states "that a lack of auditory discrimination, that is, power to distinguish similarities and differences in the sound of words, appears to be one cause for confusion in beginning reading" and also states, following a carefully controlled study,

^{1/} Monroe, Marion, "Reading Aptitude Tests for Prediction of Success and Failure in Beginning Reading", Education, Volume 56: pp. 7-14, September, 1935.

^{2/} Monroe, Marion, Children Who Cannot Read, University of Chicago Press, 1932, pp. 93-95.

^{3/} Murphy, Helen A., "An Evaluation of the Effect of Specific Training in Auditory and Visual Discrimination on Beginning Reading", unpublished Doctor's thesis, Boston University, 1943.

1

The following is a list of the names of the persons who have been appointed to the various committees of the Board of Directors of the American Red Cross Society, for the year 1917-1918.

The Board of Directors of the American Red Cross Society, for the year 1917-1918, has appointed the following committees:

1. The Committee on the Administration of the Society, consisting of the President, the Secretary, and the Treasurer.

2. The Committee on the Collection of Contributions, consisting of the President, the Secretary, and the Treasurer.

3. The Committee on the Distribution of Contributions, consisting of the President, the Secretary, and the Treasurer.

4. The Committee on the Public Relations of the Society, consisting of the President, the Secretary, and the Treasurer.

5. The Committee on the Medical and Hospital Service, consisting of the President, the Secretary, and the Treasurer.

6. The Committee on the Nursing Service, consisting of the President, the Secretary, and the Treasurer.

7. The Committee on the Food Service, consisting of the President, the Secretary, and the Treasurer.

8. The Committee on the Clothing Service, consisting of the President, the Secretary, and the Treasurer.

9. The Committee on the Shelter Service, consisting of the President, the Secretary, and the Treasurer.

10. The Committee on the Transportation Service, consisting of the President, the Secretary, and the Treasurer.

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"that specific training in auditory discrimination improves reading ability."

One of the chief purposes of educational investigations is to develop facts and principles which will form the basis for economical methods of learning and teaching. It seems, therefore, that since research finds auditory discrimination to be a definite ability needed for success in reading, it is necessary to establish a relative order of difficulty of word elements, for, by so doing, it may be possible to economize the teaching procedure, simplify the learning procedure, and decrease the opportunity for confusion in reading.

THE FIRST PART OF THE HISTORY OF THE
CITY OF LONDON, AS IT WAS IN THE
MIDDLE OF THE SEVENTEENTH CENTURY
IS NOW PUBLISHED IN TWO VOLUMES.
THE FIRST VOLUME CONTAINS THE
HISTORY OF THE CITY OF LONDON
FROM THE FIRST SETTLEMENT
TO THE PRESENT TIME.
THE SECOND VOLUME CONTAINS
A DESCRIPTION OF THE CITY
AND ITS SURROUNDINGS.
BY JOHN STOW.
LONDON, PRINTED BY J. STONE, IN THE
STREET NEXT DOOR TO THE ROYAL EXCHANGE.
1687.

CHAPTER I

SUMMARY OF RELATED RESEARCH

A careful examination of educational literature seems to reveal that the amount of scientific investigation in auditory discrimination is meager compared with that of visual discrimination. However, educators working in the field of Reading Readiness today are aware of the need for auditory discrimination skills for success in reading, as evidenced by the recent research studies which emphasize the necessity of this ability for a child to learn to read without confusion. Monroe's ^{1/} report, made after studying the influence of poor auditory discrimination on reading defect cases, supports the contention that auditory discrimination is a necessary factor for success in reading. She claims that lack of precise auditory discrimination was found to impede the learning which involved auditory impressions, and that lack of discrimination of certain sounds could lead to confusion of words, which would, in turn, affect reading progress. Substantiating the importance of well-developed auditory discrimination skills, she also reports ^{2/} a correlation of .66 plus or minus .04 between reading achievement and scores on the auditory test of her reading readiness battery. This correlation is higher than any other single score in the entire test battery. After a study of reading progress in kindergarten and primary

1/ Monroe, Marion, Children Who Cannot Read, University of Chicago Press, 1932, pp. 93-95.

2/ Monroe, Marion, "Reading Aptitude Tests for Prediction of Success and Failure in Beginning Reading", Education, Volume 56: pp. 7-14, September, 1935.

^{1/} grades, Wilson et Altera conclude that the kindergarten and first grade children who knew the most letter forms and sounds tended to be among the first to learn to read and to be the best readers, and that, conversely, the children who were ignorant of, or much confused about, letter forms and sounds tended to be very definitely the poor readers. "Accurate auditory discrimination contributes to good speech habits and to an awareness of speech sound so essential to phonetic insight", says Betts, ^{2/} and "in view of this fact it is clear that inaccurate auditory discrimination may contribute to lack of reading readiness or to a reading deficiency."

^{3/} Murphy advances the most recent conclusions regarding auditory discrimination based on an experimental study supported by statistical evidence stating that "a lack of auditory discrimination, that is, power to distinguish between similarities and differences in sound of words appears to be one cause for confusion in reading," and that "specific training in auditory discrimination improves reading ability."

An equally careful examination of educational literature reveals that as yet no reported research has been conducted to establish a relative order of difficulty of word elements in auditory discrimination.

^{1/} Wilson, F., Flemming, C., Burke, A., Garrison, C.G., "Reading Progress in Kindergarten and Primary Grades", Elementary School Journal, Volume 38: pp. 442, 1938.

^{2/} Betts, Emmett A., "Factors in Readiness for Reading", Educational Administration and Supervision, Volume XXIX: pp. 199-230, April, 1943.

^{3/} Murphy, Helen A., "An Evaluation of the Effect of Specific Training in Auditory and Visual Discrimination on Beginning Reading", unpublished Doctor's thesis, Boston University, 1943.

An order of difficulty is usually established to determine the best and most economical method of presenting material. To this end, Smith's ^{1/} study made in the Detroit Schools in 1926-1927 to discover the effect of children's matching ability as a factor in their first grade reading, furnished teachers with the relative order of difficulty in matching lower case letters, capital letters with capitals, and capital letters with lower case letters. Perhaps the greatest merit of this study was that the results were made available to teachers for use in their classrooms, and have been used as a basis for developing visual discrimination in the reading readiness programs and for introducing letters to children. Yale ^{2/} suggests the following order of difficulty in teaching elementary sounds to the deaf child:

Group I: wh, p, f, th, oo, t, ar, k, ou, and s.

Group II: v, th, m, n, b, d, g, h, y, w, z, l, r, ng, qu, x, ch, j, zh.

Group III: aw, ee, o-e, oo, -u-, -i-, -o-, i-e, oi, -a-, u-e, ur, -e-, a-e.

She states that "if sounds are presented in the order outlined, confusion which is brought about by attempting to learn at the same time elements too closely resembling each other, will be eliminated." No reference is made, however, to statistical evidence to support this statement.

1/ Smith, Nila B., "Matching Ability as a Factor in First Grade Reading", Journal of Educational Psychology, Vol. 19: pp. 560-571, November, 1928.

2/ Yale, Caroline A., Formation and Development of Elementary English Sounds, Metcalf Printing & Publishing Co., Northampton, Mass., 1938, 46 pages.

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the thirtieth is the fact that the

^{1/}
Goldstein also suggests an order of presenting vowels and consonants to the deaf child, as follows:

"ā (r) as in father; ō (o-e) as in old; ē (ee) as in eel; ū (oo) as in pool; ä (a-e) as in ale.

Diphthongs: oi, ou, ie, ae, ee, oo.

Consonants and Syllables: m, n, sh, f, k, t, r, b,

but again, no reference is made to statistical validation of the suggested method.

^{2/}
Murphy found in analyzing results of a test of auditory discrimination given to children who had no training, as well as to those who had a year of training, to find the relative order of difficulty of the various functions measured, that initial sounds were the easiest to determine, initial blends followed, then rhymes, and finally final consonants.

The most recent reference to an order of teaching is made by ^{3/}
Harrison who says that the first six consonants she would introduce are m, f, s, t, hard c, and b. Here again, no reference is made to any statistical evidence to support the suggested order of presentation.

- 1/ Goldstein, Max A., The Acoustic Method, The Laryngoscope Press, St. Louis, 1939, pp. 112-115.
- 2/ Murphy, Helen A., "An Evaluation of the Effect of Specific Training in Auditory and Visual Discrimination on Beginning Reading", unpublished Doctor's thesis, Boston University, 1943.
- 3/ Harrison, M. Lucile, "Developing Readiness for Word Recognition", Elementary English Review, Volume XXIII: p. 126, March 1946.

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Research in this field appears to be scant, and investigators seem to be handicapped by the lack of suitable means of detecting and measuring auditory discrimination.

The purpose of this study, therefore, is to attempt to locate a satisfactory instrument to measure auditory discrimination, and from an analysis of the results of this test, to establish a relative order of difficulty of word elements in auditory discrimination.

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CHAPTER II

DESCRIPTION OF MATERIALS

^{1/}
Previous research has indicated that auditory discrimination skills are necessary for success in reading, and that these skills can be taught. With this in mind, it seemed economical and wise to attempt to establish a relative order of difficulty of word elements in auditory discrimination, with the ultimate goal in view of simplifying the teaching and learning procedures. In order to satisfactorily and accurately measure the untrained abilities of children in auditory discrimination, it is necessary to test them at the very beginning of their school experience, for at that level it is assumed that as yet they have had no opportunity to acquire discrimination skills through formalized teaching.

To initiate the study, it was necessary to locate an instrument which would test auditory discrimination of initial sounds, initial blends, rhymes, and final consonants, and which would yield a reliable measure of auditory discrimination and allow a meticulous and refined analysis of the results.

A careful study of the available published group tests of reading readiness in an effort to locate those which included specific tests of auditory discrimination disclosed the following findings:

- ^{1/} Murphy, Helen A., "An Evaluation of the Effect of Specific Training in Auditory and Visual Discrimination on Beginning Reading", unpublished Doctor's thesis, Boston University, 1943.

In her auditory test, or word discrimination test, ^{1/}Monroe has nine pictures with the numbers 1, 2, and 3 under each. The child circles the number corresponding to his idea of the best way to say the name of each picture. This test is designed to measure ability to discriminate correct pronunciation of words. As part of this test, an exercise is given in which the examiner sounds out words and the children circle the word which they think has been sounded. The function of this exercise is to test ability to discriminate sounds accurately, and ability to blend sounds in word building.

^{2/}Gates uses the ability to rhyme as his method of testing auditory discrimination. The children are given a test consisting of fourteen rows of four pictures each, and are told the name of each picture if they cannot correctly identify it. There is a stimulus word for each row of pictures, and the children mark the picture of the word which rhymes with the stimulus word.

^{3/}The Lee Clark Reading Readiness Test measures visual perception by requiring the children to match letters, and it tests even a finer sense

^{1/} Monroe, Marion, "Reading Aptitude Tests", New York, Houghton Mifflin Co., 1935.

^{2/} Gates, Arthur I., "Gates Reading Readiness Tests", New York, Bureau of Publications, Teachers College, Columbia University, 1939.

^{3/} Lee, J. Murray and Clark, Willis W., "Reading Readiness Test", Los Angeles, California Test Bureau, 1931.

of visual discrimination by giving specific words and instructions to cross out the letter that does not belong in the word. For example:

bear besar

^{1/}
The Metropolitan Readiness Test measures visual perception in its first two sub-tests and vocabulary, number information, general information, and motor skills in the remaining five sub-tests. No evidence is given of a specific test of auditory discrimination.

Visual discrimination, listening, comprehending, recalling and re-telling a story, and visual-auditory recall are the skills measured by the Stevens Reading Readiness Test. ^{2/} Again no evidence is given of a specific test of auditory discrimination.

^{3/}
In the study made by Sullivan and McCarthy in which they evaluated five reading readiness tests, it was found that only two of these tests included any auditory items, and neither of those required discrimination of sounds.

As indicated by the above review, no published test was available which could be satisfactorily used to measure auditory discrimination ability,

^{1/} Hildreth, Gertrude H. and Griffiths, Nellie L., "Metropolitan Readiness Test", New York, World Book Co., 1933.

^{2/} Stevens, Avis C., "Stevens Reading Readiness Test", Columbus, Ohio, American Education Press, Inc., 1938.

^{3/} Sullivan, Helen Blair, and McCarthy, J., "An Evaluation of Reading Readiness Materials", Education, LXII, September 1941, pp. 40-43.

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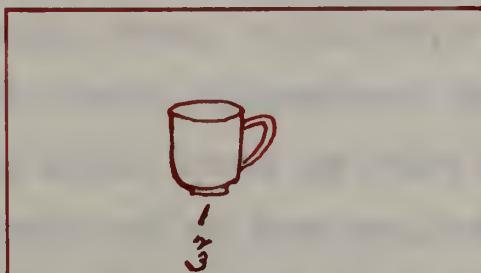
but further research revealed an as-yet-unpublished test of auditory discrimination designed by Dr. Helen Murphy.^{1/}

The initial form of this test was suggested by the Monroe Reading Aptitude Test.^{2/}

Twenty-four words which could be easily illustrated by pen and ink drawings were selected from the International Kindergarten Union Vocabulary Test.^{3/} Each of the twenty-four words were grouped with two other words of somewhat similar sound. Beneath each of the twenty-four pictures, the figures 1, 2, and 3 appeared in a column, as illustrated below:

Figure I

Item from Preliminary Form of
Murphy Group Test of Auditory Discrimination



Some of the words chosen to complete the groups had similar initial but different final sounds. For example: cup, cut, cud. Some of the words sounded alike at the beginning and end but had a slight difference in the middle, as horse, house, hose. Others were similar at the end and different at the beginning--witch, which, rich. A copy of the complete test with directions for administering may be found in Appendix A, page 33.

1/ Murphy, Helen A., "Group Test for Auditory Discrimination", unpublished test, Boston University, 1941.

2/ Monroe, Marion, "Reading Aptitude Tests", New York, Houghton Mifflin Co., 1935.

3/ "A Study of the Vocabulary of Children Before Entering the First Grade", International Kindergarten Union, Washington, D.C., 1928.

1/

In the light of the findings of the study in which this form of the test was used, a new instrument was built to include specific tests of initial sounds, final sounds, and rhymes. The test consisted of forty rows of pictures, four in each row. Initial sounds were tested in the first twenty rows, final sounds in the next ten rows, five rows of beginning blends were next, and finally there were five rows testing rhymes. The International Kindergarten Vocabulary List ^{2/} and several first grade basal readers were analyzed for frequency of words common to first grade vocabulary, and this compilation was the basis from which all the words used as guide words, as well as those illustrated in the pictures, were taken. Every letter of the alphabet, with the exception of o, q, u, x, y, and z, was included in the test of initial sounds. In each row, at least two of the four words began with the same sound as the guide word. Some rows had three pictures characterized by similar sounds, and others had four. The first word in each row corresponded with the guide word, and because of its position, the first word might be correctly discriminated more often, but this is merely an assumption for there is no evidence to support it. The incorrect words were placed in varied positions to avoid the possibility of establishing a pattern. A copy of this form of the test with directions for administering may be found in Appendix A, page 39.

- 1/ Murphy, Helen A., "An Evaluation of Exercises for Developing Auditory Discrimination", unpublished Master's thesis, Boston University, 1940.
- 2/ "A Study of the Vocabulary of Children Before Entering the First Grade", International Kindergarten Union, Washington, D.C., 1928.

The test as described was administered in mimeographed form in June to the same population to which the first form ^{1/} was given to determine the suitability of the technique for classroom administration. The results were encouraging since the children were able to follow the directions, and they seemed to enjoy the game. The scoring of the test was by rows. For each entirely correct row, one point was allowed.

In September the test was given to twenty-six children just beginning the first grade. It was found to require approximately thirty-five minutes to administer, and appeared interesting enough to the children so that they were willing to actively enter into the completion of the task. The group results of this test and the results mentioned above (the tests given in June) were analyzed to find the relative order of difficulty of the various functions which the test attempted to measure. Table I shows the results of this analysis.

TABLE I
ERRORS ON AUDITORY TEST

Function	Percent of Error	
	Group I	Group II
Initial Sounds	14.8	23.0
Initial Blends	20.0	32.0
Rhymes	26.0	31.0
Final Consonants	39.0	40.0

The initial sounds in each case had the fewest errors, the initial blends were next, rhymes followed, and finally the most difficult were final consonants.

1/ Murphy, Helen A., "An Evaluation of Exercises for Developing Auditory Discrimination", unpublished Master's thesis, Boston University, 1940.

The first of these is the fact that the
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TABLE I		TABLE II	
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
25	26	27	28
29	30	31	32
33	34	35	36
37	38	39	40
41	42	43	44
45	46	47	48
49	50	51	52
53	54	55	56
57	58	59	60
61	62	63	64
65	66	67	68
69	70	71	72
73	74	75	76
77	78	79	80
81	82	83	84
85	86	87	88
89	90	91	92
93	94	95	96
97	98	99	100

the first of these is the fact that the
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With this analysis as a basis, the test was revised and all vowels as initial sounds were omitted. The initial blends were placed after the initial consonants. The final sounds were next, and then rhymes. This arrangement made it necessary to give the directions only once for initial sounds and once for final sounds. The revised form of the test consists of four practice rows - namely, b, c, d, and f, for initial sounds; twelve rows testing initial consonants - namely, g, h, j, l, m, n, p, r, s, t, w, and v; five rows testing initial blends - namely, ch, sh, tr, sp, and st; one practice row of final consonants - namely, m; nine rows of testing final consonants - namely, y, n, t, g, d, s, k, l, and p; and five rows testing rhymes - namely, ing, un, at, an, and, making thirty-six rows in all.

The test just described - The Group Test of Auditory Discrimination,^{1/} seemed to provide an opportunity to accurately test the auditory discrimination abilities of children, and was therefore selected as the test to be given, the results and analysis of which constitute this thesis.

^{1/} Murphy, Helen A., "Group Test for Auditory Discrimination", unpublished test, Boston University, 1941.

CHAPTER III

PLAN OF EXPERIMENT

The Group Test for Auditory Discrimination^{1/} designed by Murphy was selected as the instrument to be used to measure auditory discrimination, and the results of this test were analyzed to establish the relative order of difficulty of word elements.

Definition of Terms

In this study auditory discrimination is defined as the ability to perceive similarities and differences in the sound of words.

In this study word element is defined as "(1) any part of a word that constitutes an irreducible minimum; a letter; (2) any part of a word that cannot be reduced for practical purposes, such as the suffix ing; (3) any part of a word, such as a phonogram or syllable, that aids the reader in understanding the pronunciation and meaning of the word."^{2/}

Selection and Status of Population

The Director of Parochial Schools of a large Eastern city agreed to open four of his schools, and the Superintendent of Public Schools opened three of his schools so that the testing program could be conducted.

1/ Murphy, Helen A., "Group Test for Auditory Discrimination", unpublished test, Boston University, 1941.

2/ Good, Carter V., Editor, Dictionary of Education, New York, McGraw Hill Company, Inc., 1945.

THE STATE

OF NEW YORK

IN SENATE,
January 1, 1891.
REPORT OF THE
COMMISSIONERS OF THE LAND OFFICE,
IN RESPONSE TO A RESOLUTION PASSED BY THE SENATE,
MAY 1, 1890.

ALBANY:

WILLIAM H. BROWN, PRINTING OFFICE,
1891.
THE STATE OF NEW YORK,
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MAY 1, 1890.

The testing program was begun the second day of school, in September. The tests were administered to two hundred and thirty-seven children in seven first grade classrooms. The Detroit Beginning First Grade Intelligence Test ^{1/} and the Pintner-Cunningham Primary Test ^{2/} were given and the scores were averaged to obtain the mental ages of the children. The Lee-Clark Reading Readiness Test, ^{3/} a standard test with norms, was given to serve as a stabilizing instrument since the group test ^{4/} used in the experiment was unstandardized. The Group Test for Auditory Discrimination ^{5/} was then administered and the results were analyzed to determine the relative order of difficulty of word elements in auditory discrimination. The data are reported in Chapter IV of this thesis.

^{1/} Published by World Book Company, Yonkers-on-Hudson, New York, 1937.

^{2/} Published by World Book Company, Yonkers-on-Hudson, New York, 1939.

^{3/} Published by California Test Bureau, Los Angeles, California.

^{4/} Murphy, Helen A., "Group Test for Auditory Discrimination", unpublished test, Boston University, 1941.

^{5/} Loc. cit.

CHAPTER IV

ANALYSIS OF DATA

The purpose of the study was to establish a relative order of difficulty of word elements in auditory discrimination.

The results of the Group Test for Auditory Discrimination^{1/} were analyzed to find:

1. The relative order of difficulty of initial sounds.
2. The relative order of difficulty of initial blends.
3. The relative order of difficulty of final consonants.
4. The relative order of difficulty of rhymes.
5. The relationship in the order of difficulty of those letters used as both beginning and final consonants.

Data obtained from the Detroit Beginning First Grade Intelligence Test^{2/} and the Pintner-Cunningham Primary Test^{3/} were analyzed to find the mean mental ages of 237 children used in this experiment. The mean chronological age for those children was also computed. The mean score of the Lee Clark Reading Readiness Test^{4/} was found for this same population.

- ^{1/} Murphy, Helen A., "Group Test for Auditory Discrimination", unpublished test, Boston University, 1941.
- ^{2/} Published by World Book Company, Yonkers-on-Hudson, New York, 1937.
- ^{3/} Published by World Book Company, Yonkers-on-Hudson, New York, 1939.
- ^{4/} Published by California Test Bureau, Los Angeles, California.

THE
SCHOOL OF THE
FUTURE

It is the purpose of this school to provide for the future of the world.

The school is open to all who are interested in the future of the world.

It is the purpose of this school to provide for the future of the world.

- 1. The school is open to all who are interested in the future of the world.
- 2. The school is open to all who are interested in the future of the world.
- 3. The school is open to all who are interested in the future of the world.
- 4. The school is open to all who are interested in the future of the world.

The school is open to all who are interested in the future of the world.

The school is open to all who are interested in the future of the world.

The school is open to all who are interested in the future of the world.

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The school is open to all who are interested in the future of the world.

The school is open to all who are interested in the future of the world.

The results of the Group Test for Auditory Discrimination^{1/} were also analyzed for the mean score.

Table II shows the mean chronological and mental ages of the 237 children used in this experiment.

TABLE II

MEAN CHRONOLOGICAL AND MENTAL AGES OF THE GROUP STUDIED

	Number	Mean C.A.	S.D.	Mean M.A.	S.D.	
	237	72.52	4.80	71.15	7.75	

The mean chronological age for the 237 children in the experiment was 72.52. The mean mental age for these same children was 71.15. Since there is only a difference of 1.37 months between the mean chronological and mental ages, this suggests that the population was normal.

^{1/} Murphy, Helen A., "Group Test for Auditory Discrimination", unpublished test, Boston University, 1941.

Table III shows the mean score on the Lee Clark Reading Readiness Test.

TABLE III

MEAN SCORE OF GROUP STUDIED ON LEE CLARK TEST

	Number	Mean	S.D.	
	237	26.76	11.61	

The mean score on the Lee Clark Reading Readiness Test for the group studied was 26.76.

Table IV shows the mean score on the Group Test for Auditory Discrimination for this same group. The total possible score was 124.

TABLE IV

MEAN SCORE ON THE GROUP TEST FOR AUDITORY DISCRIMINATION

	Number	Mean	S.D.	
	237	70.05	19.94	

The mean score of the Group Test for Auditory Discrimination for this group was 70.05. The range of the test was from 12 to 115.

Table V shows the relative order of difficulty of initial consonants as computed from the analysis of the results of the Group Test for Auditory Discrimination.

TABLE V

RELATIVE ORDER OF DIFFICULTY OF INITIAL CONSONANTS BASED ON 237 CASES ^{1/}

Consonant	Per Cent of Error	Probable Error of Per Cent	
g	.161	.024	
r	.208	.026	
h	.221	.027	
s	.229	.027	
p	.244	.028	
j	.247	.028	
n	.249	.028	
t	.260	.028	
l	.279	.029	
m	.289	.029	
v	.293	.029	
w	.295	.030	

This table shows that "g" is the easiest initial consonant for auditory discrimination for this group. "W" is the most difficult initial consonant. "R" is more difficult than "g" though not as difficult as "h". Both "h" and "s" are similarly difficult to distinguish but "s" is the more difficult of the two.

^{1/} Edgerton, H.A., and Patterson, D.G., "Table of Standard Errors and Probable Errors of Percentages for Varying Numbers of Cases", Journal of Applied Psychology, Volume 10: pp. 378-391, September, 1926.

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"p", "j", and "n" are more difficult than "s" but the three are relatively difficult. "t" is more difficult than "n" and "l" is more difficult than "t". The "m" sound is more difficult than "l" as evidenced by its position in the order of difficulty of the tenth most difficult sound. "w" and "v" are the most difficult to distinguish and the two are of approximate equality in difficulty.

Table VI shows the relative order of difficulty of initial blends as derived from the analysis of the results of the Group Test for Auditory Discrimination.

TABLE VI

RELATIVE ORDER OF DIFFICULTY OF INITIAL BLENDS BASED ON 237 CASES			
Initial Blends	Per Cent of Error	Probable Error of Per Cent ^{1/}	
ch	.201	.026	
sp	.223	.027	
tr	.226	.027	
st	.228	.027	
sh	.284	.029	

Table VI shows that of the blends included in the test "ch" is the easiest. "Sh" is the most difficult. It will be noted that "ch" as the least difficult blend is more difficult than "g" which is the easiest initial consonant. The blend "sp" is considerably more difficult than "ch" but is of similar difficulty to "tr" and "st". The most difficult blend, "sh", is approximately comparable to "w" and "v", the most difficult initial consonants.

^{1/} Edgerton, H.A., and Patterson, D.G., "Table of Standard Errors and Probable Errors of Percentages for Varying Numbers of Cases", Journal of Applied Psychology, Volume 10: pp. 378-391, September, 1926.

The first of these is the fact that the
 ... of the ... is ...
 ... of the ... is ...
 ... of the ... is ...
 ... of the ... is ...

The second of these is the fact that the
 ... of the ... is ...
 ... of the ... is ...

TABLE I

The ... of the ...

...
...
...
...
...
...

The third of these is the fact that the
 ... of the ... is ...
 ... of the ... is ...
 ... of the ... is ...

The fourth of these is the fact that the
 ... of the ... is ...
 ... of the ... is ...

Table VII shows the relative order of difficulty of final consonants as computed from the analysis of the results of the Group Test for Auditory Discrimination.

TABLE VII

RELATIVE ORDER OF DIFFICULTY OF FINAL CONSONANTS BASED ON 237 CASES		
Final Consonant	Per Cent of Error	Probable Error of Per Cent ^{1/}
y	.282	.029
s	.289	.032
t	.306	.030
k	.311	.030
l	.324	.030
n	.395	.032
g	.406	.032
p	.424	.032
d	.426	.032

The final consonant "y" is the easiest to discriminate while "d" is the most difficult. "S" is fairly comparable to "y" but it is interesting to note that both "s" and "y" as relatively easy final consonants are equal to the most difficult initial consonants. "T" is more difficult than "s" and "k" is more difficult than "t". "N" is much more difficult than "l" and "g" is more difficult than "n". "p" and "d" are the most difficult final consonants and they are considerably more difficult than "g". All but the first two final consonants - namely, "y" and "s" are more difficult than the most difficult initial consonants.

^{1/} Edgerton, H.A., and Patterson, D.G., "Table of Standard Errors and Probable Errors of Percentages for Varying Numbers of Cases", Journal of Applied Psychology, Volume 10: pp. 378-391, September, 1926.

Table VIII shows the relative order of difficulty of rhymes as computed from the analysis of the results of the Group Test for Auditory Discrimination.

TABLE VIII

RELATIVE ORDER OF DIFFICULTY OF RHYMES BASED ON 237 CASES ^{1/}		
Rhymes	Per Cent of Error	Probable Error of Per Cent
ing	.151	.023
an	.233	.027
un	.239	.028
and	.257	.028
at	.266	.029

This table shows that of the rhymes included in the test, the phonogram "ing" is very much easier than any of the others. "At" is noticeably more difficult. The phonogram "ing" is easier than the initial consonant "g" to distinguish. "An and "un" are fairly comparable in difficulty and follow "ing" in the order established above. "And" is more difficult than "un" and is more difficult than the initial blend, "st". "At" is the most difficult rhyme to distinguish but it is wise to recognize that it is easier to distinguish than even the least difficult final consonant.

^{1/} Edgerton, H.A., and Patterson, D.G., "Table of Standard Errors and Probable Errors of Percentages for Varying Numbers of Cases", Journal of Applied Psychology, Volume 10: pp. 378-391, September, 1926.

Table IX shows the relative order of difficulty of those letters used as both beginning and final consonants.

TABLE IX

RELATIONSHIP IN THE ORDER OF DIFFICULTY OF THOSE LETTERS USED AS BOTH BEGINNING AND FINAL CONSONANTS BASED ON 237 CASES

Alphabetical order of letters	g	l	n	p	s	t
Per cent of error as beginning consonants	.162	.279	.249	.245	.229	.260
Per cent of error as final consonant	.406	.324	.395	.424	.289	.306

Table X shows the relative order of difficulty in numerical order of those consonants used as final and initial in this study.

TABLE X

RELATIVE ORDER OF DIFFICULTY IN NUMERICAL ORDER OF THOSE CONSONANTS USED AS BOTH BEGINNING AND FINAL CONSONANTS BASED ON 237 CASES

Alphabetical order of letters	g	l	n	p	s	t
Beginning Consonants in numerical order of difficulty	1	6	4	3	2	5
Final Consonants in numerical order of difficulty	5	3	4	6	1	2

Table IX and Table X show the relative order of difficulty of the beginning consonants in relation to the relative order of difficulty of the final consonants. It is interesting to observe that the easiest final consonant in this grouping has a higher per cent of error than the most difficult

beginning consonant. The sound "s" seems to be the easiest to distinguish both in final and initial consonants. While "g" is the easiest initial consonant, it is the second most difficult final consonant. "l" is just twice as easy to distinguish when it is a final consonant as when it is a beginning consonant. "n" remains in the same position both as an initial and final consonant. "p" as an initial consonant is twice as easy to distinguish as it is when used as a final consonant. "t" is much more difficult to distinguish as a beginning consonant than as a final consonant.

CHAPTER V

SUMMARY AND CONCLUSIONS

The purpose of this study was to establish a relative order of difficulty of word elements in auditory discrimination.

A Group Test for Auditory Discrimination was administered during the first week of school, in September, to 237 children in seven first grades. The test was designed to measure untrained abilities in auditory discrimination, and the results of the tests were analyzed in an effort to establish the following orders of difficulty:

1. The relative order of difficulty of initial sounds.
2. The relative order of difficulty of initial blends.
3. The relative order of difficulty of final consonants.
4. The relative order of difficulty of rhymes.
5. The relationship in the order of difficulty of those letters used as both beginning and final consonants.

CONCLUSIONS

The Relative Order of Difficulty of Initial Sounds

In this study "g" was found to be the easiest initial consonant in auditory discrimination for the group tested. "w" was found to be the most difficult initial consonant. "r" was found to be more difficult than "g", though not as difficult as "h". Both "h" and "s" were found to be similarly difficult to distinguish, but "s" the more difficult of the two. "p", "j", and "n" were found to be more difficult than "s", but the three appeared to be relatively difficult. "t" was found to be

more difficult than "n", and "l" more difficult than "t". The "m" sound was found to be more difficult than "l". "w" and "v" were found to be the most difficult initial consonants to distinguish, and the two appeared approximately equal in difficulty.

The Relative Order of Difficulty of Initial Blends

In this study "ch" was found to be the easiest of the initial blends tested. "Sh" was found to be the most difficult. "Ch", the least difficult blend was found to be more difficult than "g", the easiest initial consonant. The blend "sp" was found to be more difficult than "ch", but of similar difficulty to "tr" and "st". The most difficult blend, "sh", was found to be approximately comparable in difficulty to "w" and "v", the most difficult initial consonants.

The Relative Order of Difficulty of Final Consonants

In this study the final consonant "y" was found to be the easiest to discriminate, while "d" was found to be the most difficult. "S" was found to be fairly comparable to "y", but both "s" and "y" as relatively easy final consonants were found to be equal in difficulty to the most difficult initial consonants. "t" was found to be more difficult than "s" as a final consonant, and "k" more difficult than "t". "N" was found to be much more difficult than "l", and "g" more difficult than "n". "p" and "d" were found to be the most difficult final consonants. They were found to be considerably more difficult than "g". All but the first two final consonants - namely, "y"

and "s" were found to be more difficult than the most difficult initial consonants.

The Relative Order of Difficulty of Rhymes

In this study the phonogram "ing" was found to be much easier than any of the other rhymes included in the test. "At" was found to be noticeably more difficult, but even as the most difficult rhyme tested it was found to be easier to distinguish than the least difficult final consonant. The phonogram "ing" was found to be easier to distinguish than the initial consonant "g" for the group tested. "An" and "un" were found to be fairly comparable in difficulty and followed "ing" in the order established. "And" was found to be more difficult than "un" and more difficult than the initial blend "st".

The Relationship in the Order of Difficulty of Those Letters Used as Both Beginning and Final Consonants.

In this study six of the consonants were used and tested both as initial and final consonants. The easiest final consonant in this grouping was found to have a higher per cent of error than the most difficult beginning consonant in the same grouping. The sound "s" was found to be the easiest to distinguish both in final and initial consonants. "G" was found to be the easiest initial consonant, and the second most difficult final consonant. "I" was found to be twice as easy to distinguish when used as a final consonant as when used as a beginning consonant. "N" was found to remain in the same position both as an initial and a

final consonant. "p" as an initial consonant was found to be twice as easy to distinguish as when used as a final consonant. "t" was found to be much more difficult to distinguish as a beginning consonant than when used as a final consonant.

The educational implication of this study seems to be that if the results are made available to teachers so that they may know which sounds to introduce first and where to place emphasis, and accordingly plan and adjust their instruction, the learning procedure may be simplified, opportunity for confusion may be decreased, and the opportunity for success in reading may be appreciably increased.

Chapman, John

1. Chapman, John, 1811-1882. *Life of John Chapman*.
New York: H. Holt, 1882.
2. Chapman, John. *Life of John Chapman*.
New York: H. Holt, 1882.

3. Chapman, John. *Life of John Chapman*.
New York: H. Holt, 1882.
4. Chapman, John. *Life of John Chapman*.
New York: H. Holt, 1882.
5. Chapman, John. *Life of John Chapman*.
New York: H. Holt, 1882.

6. Chapman, John. *Life of John Chapman*.
New York: H. Holt, 1882.
7. Chapman, John. *Life of John Chapman*.
New York: H. Holt, 1882.
8. Chapman, John. *Life of John Chapman*.
New York: H. Holt, 1882.
9. Chapman, John. *Life of John Chapman*.
New York: H. Holt, 1882.
10. Chapman, John. *Life of John Chapman*.
New York: H. Holt, 1882.

CHAPTER VI

SUGGESTIONS FOR FURTHER RESEARCH

1. Repeat the experiment by arranging the test so that b, c, d, and f may be tested to determine their place in the order of difficulty.
2. Repeat the experiment on a larger population.
3. Study the order of difficulty in relation to sex differences and intelligence quotients.
4. Compare the method of teaching auditory discrimination just evolved with those methods suggested in teachers' manuals.
5. Conduct an experiment by teaching auditory discrimination through specific exercises based on and according to the order of difficulty herein determined, and measure the progress and success in reading of the experimental group with a group taught according to a method suggested in a teachers' manual.

THE
SOCIETY OF THE
SIX

1. The Society of the Six is a group of six men who are
connected by a common bond of friendship and loyalty.

2. The Society of the Six is a group of six men who are

connected by a common bond of friendship and loyalty.

3. The Society of the Six is a group of six men who are

connected by a common bond of friendship and loyalty.

4. The Society of the Six is a group of six men who are

connected by a common bond of friendship and loyalty.

5. The Society of the Six is a group of six men who are

connected by a common bond of friendship and loyalty.

6. The Society of the Six is a group of six men who are

connected by a common bond of friendship and loyalty.

APPENDIX A

AUDITORY DISCRIMINATION TESTS

AUDITORY DISCRIMINATION TEST

First Form




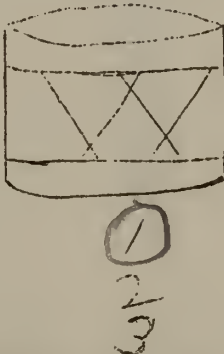
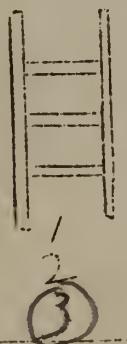

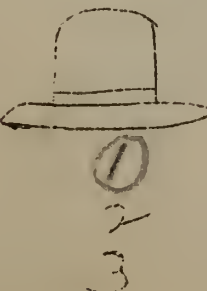

DIRECTIONS FOR ADMINISTERING

THE
JOURNAL
OF THE
ROYAL ANTHROPOLOGICAL INSTITUTE
VOLUME 10
PART 1
1980

NAME Indeck, Albert

33

SCHOOL _____

1 	5 
2 	6 
3 	7 
4 	8 

DATE _____

SCORE 21

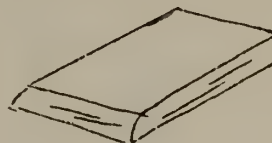
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1
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5



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2



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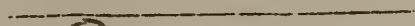
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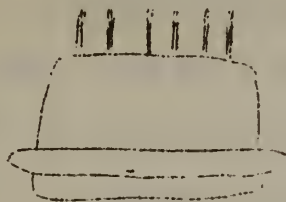
8



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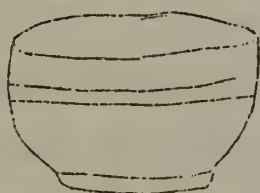
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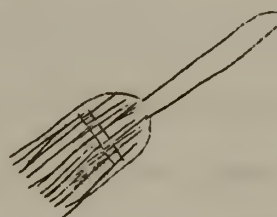
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②
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①
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3

7



1
②
③

4



1
②
3

8



①
2
3

DIRECTIONS FOR ADMINISTERING THE GROUP AUDITORY TEST

Each child has a mimeographed copy of the test. The examiner reads the prescribed sentences, speaking distinctly, but being careful that no clue to the correct answer is given by an inflection in the voice. The children circle the number of the sentence which is correct for the picture.

Say to the children, "Let us look at the first picture. What is it a picture of? Yes, A cup. I will read three sentences to you, Listen and see which sentence is correct. The words will all sound somewhat alike so listen very carefully."

Read: 1. This is a cut.

2. This is a cup.

3. This is a cud.

"Which one was right?" "Yes, two. Put a circle around the 2 under the picture of the cup on your paper." Take time to see that each child does it correctly so that you may be sure the directions are understood.

"Now find the picture of the house. Listen while I read to you. Be sure to listen for the word house."

Read: This is a horse.

2. This is a hose.

3. This is a house.

"Which one was right? Yes, three. Put a circle around the 3 under the picture." Check each child to see that he has followed your directions.

"Now I am going to read three sentences for each of the other pictures. I will not help you any more so listen very carefully."

THE HISTORY OF THE CITY OF BOSTON

AND THE ADJACENT TOWNS, FROM THE FIRST SETTLEMENT TO THE PRESENT TIME. BY SAMUEL JOHNSON, ESQ. OF NEW-YORK.

IN TWO VOLUMES. VOL. I. THE FIRST SETTLEMENT TO THE YEAR 1700. LONDON: PRINTED BY J. BELLAMY, IN ST. PAULS CHURCH-YARD, 1765.

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THE HISTORY OF THE CITY OF BOSTON, AND THE ADJACENT TOWNS, FROM THE FIRST SETTLEMENT TO THE PRESENT TIME. BY SAMUEL JOHNSON, ESQ. OF NEW-YORK.

Read: Picture 3

"1. This is a letter."

"2. This is a litter."

"3. This is a ladder."

Picture 4

"1. This is a hat."

"2. This is a hatch."

"3. This is a hats."

Picture 5

"1. This is a fort."

"2. This is a fork."

"3. This is a fourth."

Picture 6

"1. This is a drum."

"2. This is a drawn."

"3. This is a drown."

Picture 7

"1. This is a camel."

"2. This is a kettle."

"3. This is a candle."

Picture 8

"1. This is a came."

"2. This is a cane."

"3. This is a cone."

Picture 1

- "1. This is a leaf."
- "2. This is a left."
- "3. This is a leave."

Picture 2

- "1. This is a moan."
- "2. This is a noon."
- "3. This is a moon."

Picture 3

- "1. This is a line."
- "2. This is a lion."
- "3. This is a lines."

Picture 4

- "1. This is a neck."
- "2. This is a nest."
- "3. This is a next."

Picture 5

- "1. This is a broke."
- "2. This is a back."
- "3. This is a book."

Picture 6

- "1. This is a bag."
- "2. This is a badge."
- "3. This is a bad."

Picture 7

- "1. This is a cloak."
- "2. This is a clock."
- "3. This is a close."

Picture 8

- "1. This is a chain."
- "2. This is a chair."
- "3. This is a chalk."

1. 100000

- 1. 100000 100000 .00
- 1. 100000 100000 .00
- 1. 100000 100000 .00

2. 100000

- 1. 100000 100000 .00
- 1. 100000 100000 .00
- 1. 100000 100000 .00

3. 100000

- 1. 100000 100000 .00
- 1. 100000 100000 .00
- 1. 100000 100000 .00

4. 100000

- 1. 100000 100000 .00
- 1. 100000 100000 .00
- 1. 100000 100000 .00

5. 100000

- 1. 100000 100000 .00
- 1. 100000 100000 .00
- 1. 100000 100000 .00

6. 100000

- 1. 100000 100000 .00
- 1. 100000 100000 .00
- 1. 100000 100000 .00

7. 100000

- 1. 100000 100000 .00
- 1. 100000 100000 .00
- 1. 100000 100000 .00

8. 100000

- 1. 100000 100000 .00
- 1. 100000 100000 .00
- 1. 100000 100000 .00

Picture 1

- "1. This is a cape."
- "2. This is a cake."
- "3. This is a kate."

Picture 2

- "1. This is a ball."
- "2. This is a bell."
- "3. This is a bowl."

Picture 3

- "1. This is a ring."
- "2. This is a rang."
- "3. This is a rung."

Picture 4

- "1. This is a fit."
- "2. This is a fish."
- "3. This is a fix."

Picture 5

- "1. This is a pear."
- "2. This is a tear."
- "3. This is a bear."

Picture 6

- "1. This is a power."
- "2. This is a flower."
- "3. This is a tower."

Picture 7

- "1. This is a boom."
- "2. This is a bloom."
- "3. This is a broom."

Picture 8

- "1. This is a witch."
- "2. This is a which."
- "3. This is a rich."

The score is the number of correct items.

Table 1

1. 1950-1951	100
2. 1952-1953	100
3. 1954-1955	100

Table 2

1. 1950-1951	100
2. 1952-1953	100
3. 1954-1955	100

Table 3

1. 1950-1951	100
2. 1952-1953	100
3. 1954-1955	100

Table 4

1. 1950-1951	100
2. 1952-1953	100
3. 1954-1955	100

Table 5

1. 1950-1951	100
2. 1952-1953	100
3. 1954-1955	100

Table 6

1. 1950-1951	100
2. 1952-1953	100
3. 1954-1955	100

Table 7

1. 1950-1951	100
2. 1952-1953	100
3. 1954-1955	100

Table 8

1. 1950-1951	100
2. 1952-1953	100
3. 1954-1955	100

1. 1950-1951 100

AUDITORY DISCRIMINATION TEST

Second Form

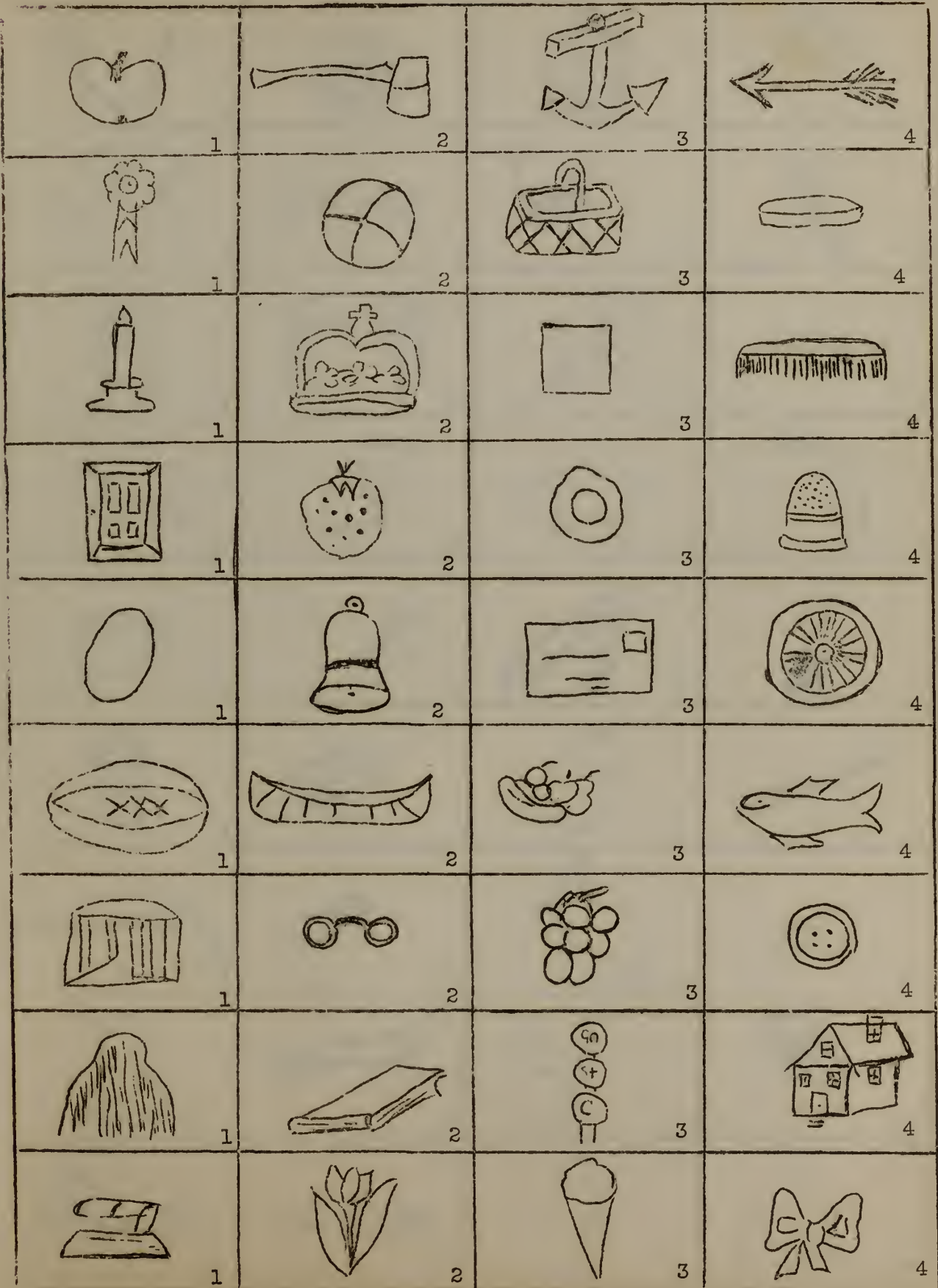
DIRECTIONS FOR ADMINISTERING

THE UNIVERSITY OF CHICAGO
LIBRARY
520 EAST 58TH STREET
CHICAGO, ILL. 60637

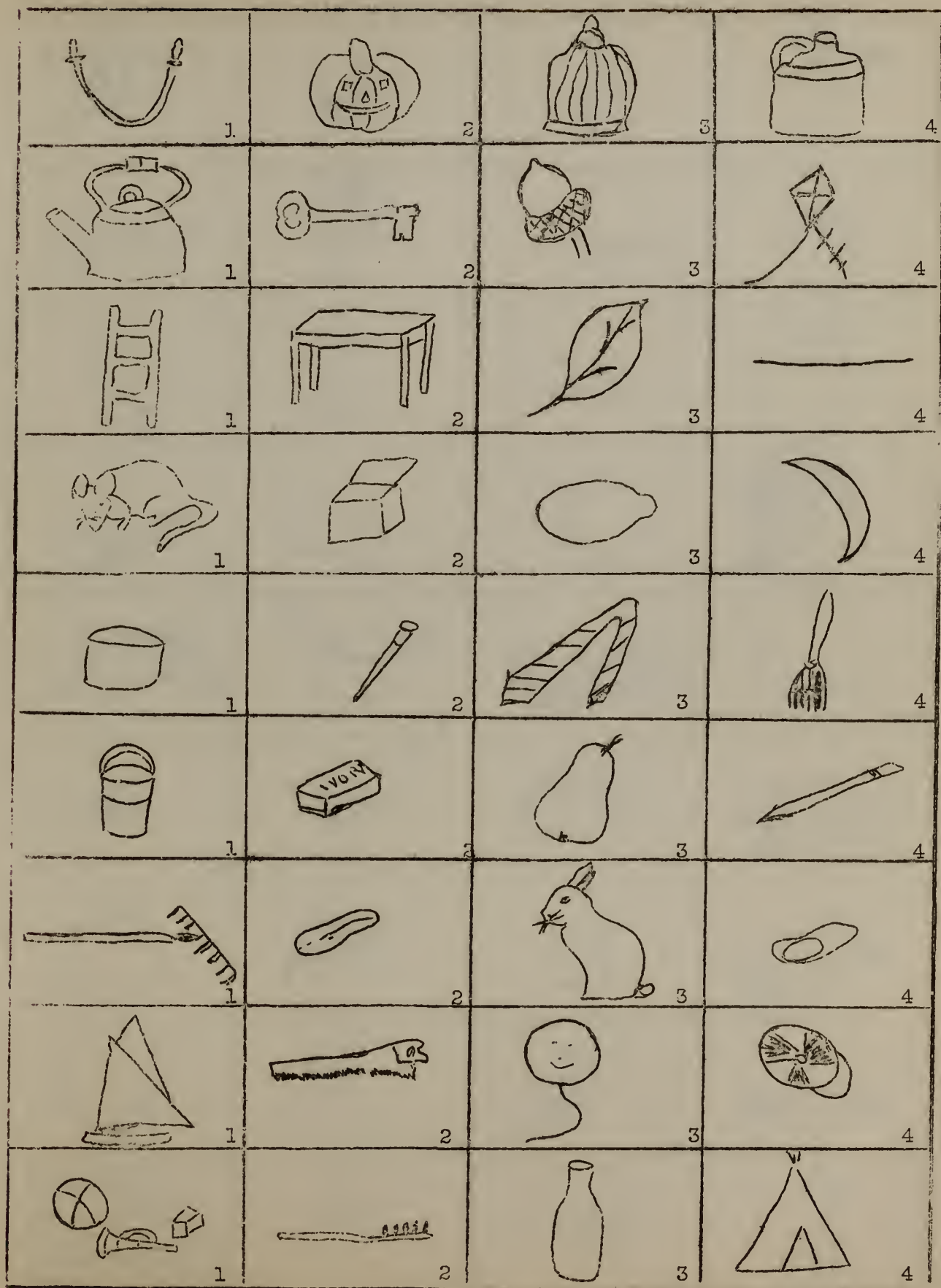
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Date _____

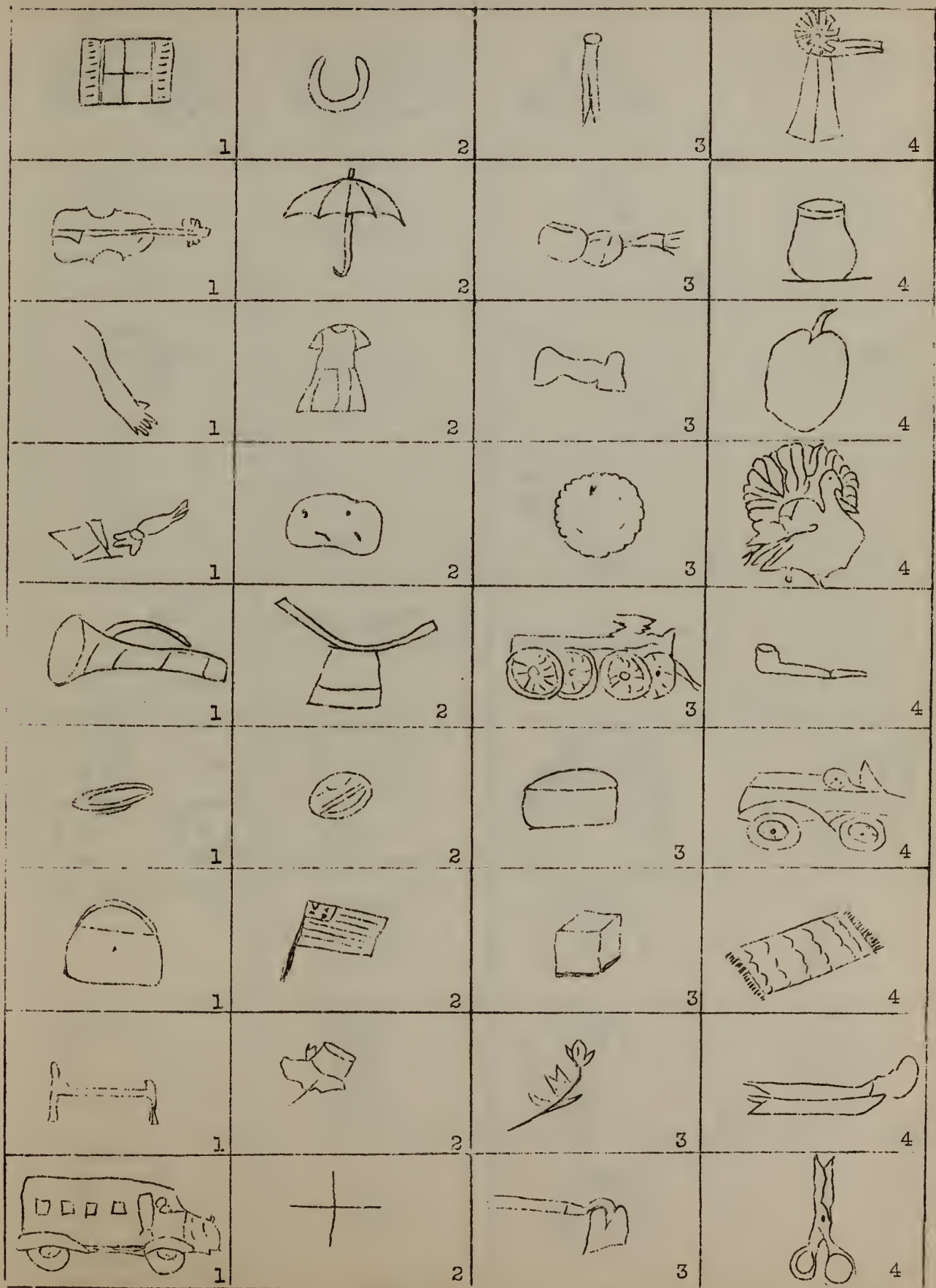
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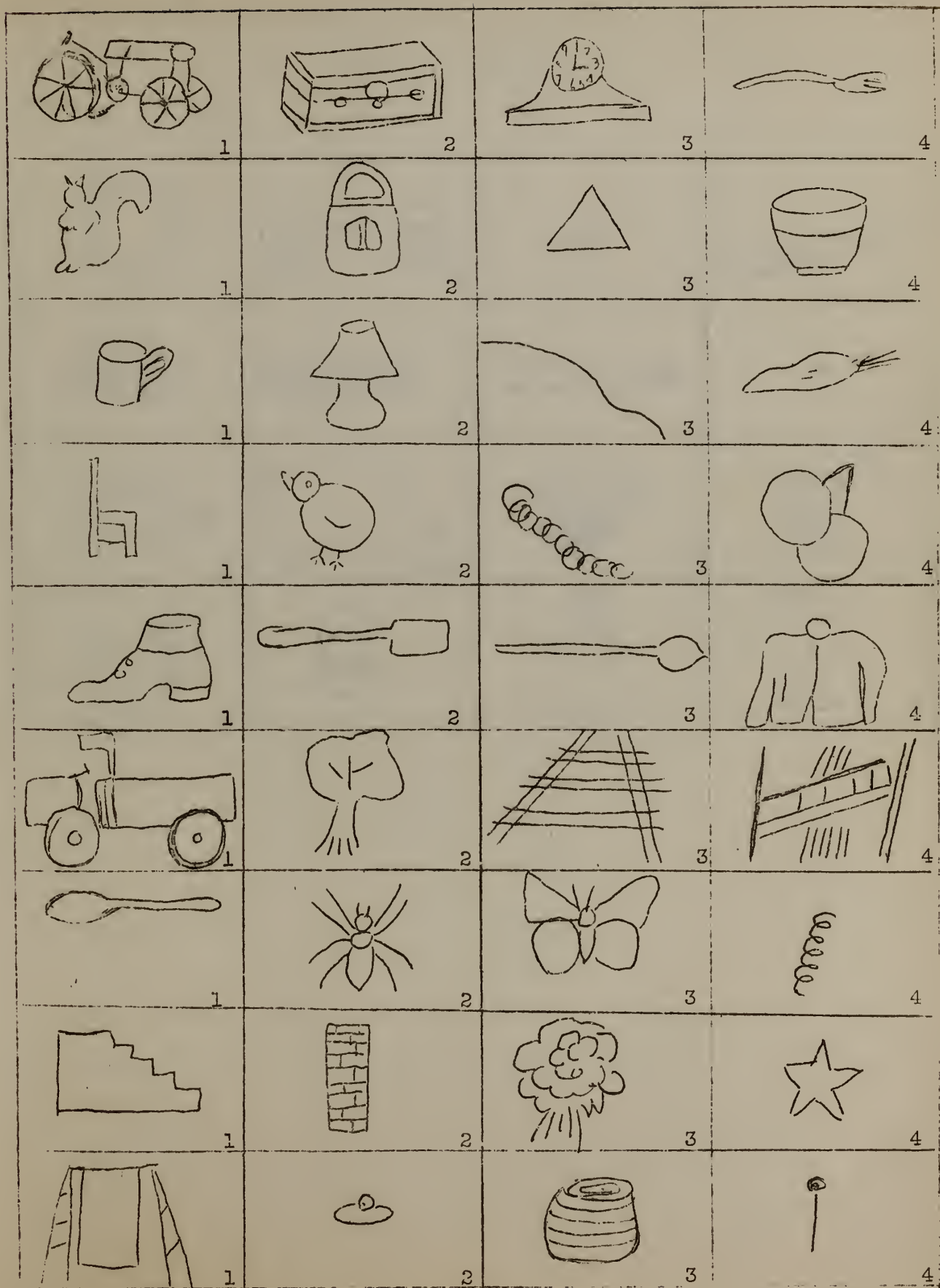




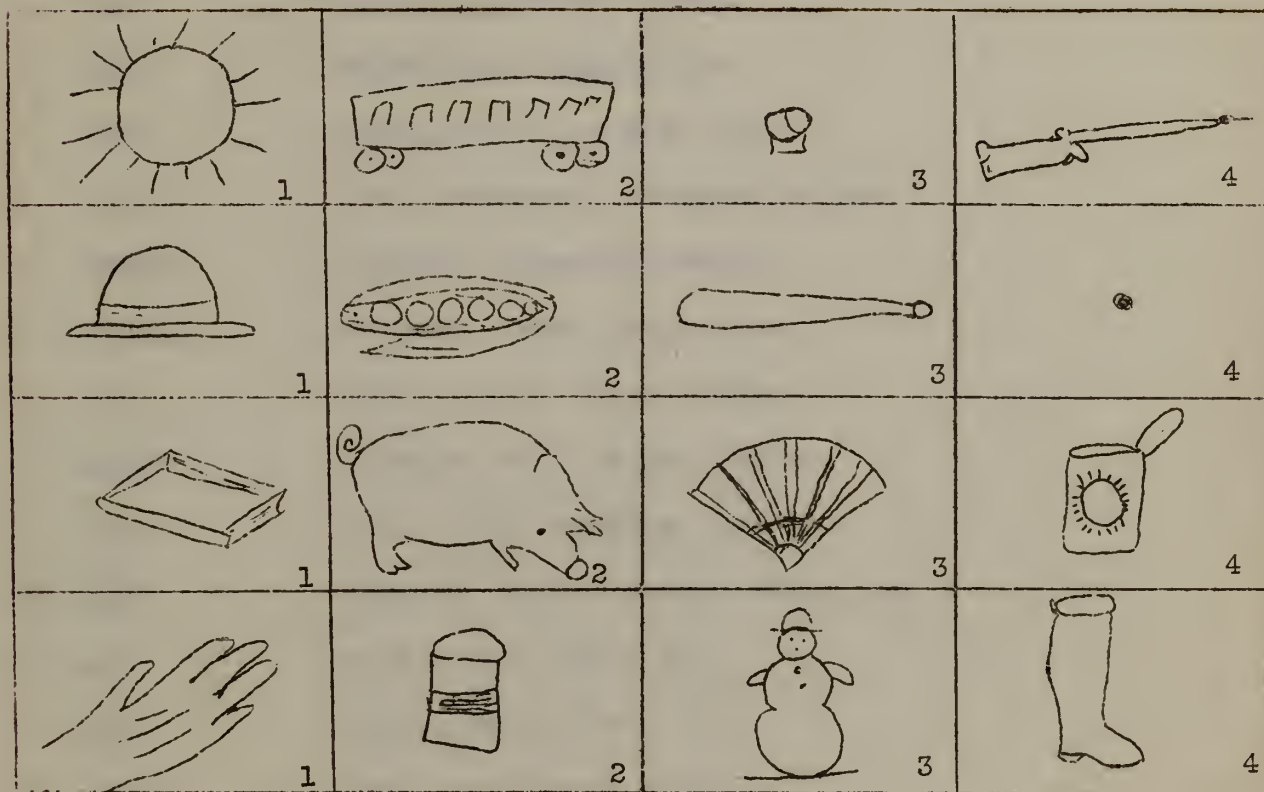




1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
25	26	27	28
29	30	31	32



一	二	三	四
五	六	七	八
九	十	十一	十二
十三	十四	十五	十六
十七	十八	十九	二十
二十一	二十二	二十三	二十四
二十五	二十六	二十七	二十八
二十九	三十	三十一	三十二
三十三	三十四	三十五	三十六
三十七	三十八	三十九	四十
四十一	四十二	四十三	四十四
四十五	四十六	四十七	四十八
四十九	五十	五十一	五十二
五十三	五十四	五十五	五十六
五十七	五十八	五十九	六十
六十一	六十二	六十三	六十四
六十五	六十六	六十七	六十八
六十九	七十	七十一	七十二
七十三	七十四	七十五	七十六
七十七	七十八	七十九	八十
八十一	八十二	八十三	八十四
八十五	八十六	八十七	八十八
八十九	九十	九十一	九十二
九十三	九十四	九十五	九十六
九十七	九十八	九十九	一百



1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

GROUP AUDITORY TEST

Beginning consonants

- | | |
|------------|---|
| 1. and | apple, ax, anchor, arrow |
| 2. bird | badge, ball, basket, dish |
| 3. cake | candle, crown, square, comb |
| 4. dance | door, strawberry, doughnut, thimble |
| 5. Eskimo | egg, bell, envelope, wheel |
| 6. father | football, canoe, fruit, fish |
| 7. go | gate, glasses, grape, button |
| 8. hammer | haystack, book, signal, house |
| 9. Irene | iron, tulip, icecream, bow |
| 10. jello | jumprope, jack-o-lantern, cage, jug |
| 11. keep | kettle, key, acorn, kite |
| 12. like | ladder, table, leaf, line |
| 13. mother | mouse, box, lemon, moon |
| 14. name | nest, nail, necktie, broom |
| 15. paint | pail, soap, pear, pencil |
| 16. red | rake, peanut, rabbit, rubber |
| 17. sing | sailboat, saw, balloon, cap |
| 18. take | toys, toothbrush, bottle, tent |
| 19. wait | window, horseshoe, clothespin, windmill |
| 20. very | violin, umbrella, vegetables, vase |

Final consonants

- | | |
|-----------|------------------------------|
| 21. from | arm, dress, bone, plum |
| 22. early | candy, potato, cooky, turkey |

General Information

Administrative Data

1. Name of the organization	2. Address
3. Phone number	4. Fax number
5. E-mail address	6. Website
7. Date of establishment	8. Type of organization
9. Number of employees	10. Annual budget
11. Main activities	12. Key personnel
13. Description of services	14. Financial statements
15. List of projects	16. Evaluation reports
17. Contact information	18. Other relevant data

Administrative Data

19. Date of last update	20. Version number
21. Author	22. Reviewer

23. fern	horn, apron, wagon, pipe
24. start	plate, walnut, bread, automobile
25. dog	bag, flag, cube, rug
26. crowd	bed, bonnet, bud, sled
27. grass	bus, cross, hoe, scissors
28. trick	tractor, trunk, clock, fork
29. girl	squirrel, lock, triangle, bowl
30. peep	cup, lamp, hill, carrot

Beginning blends

31. chop	chair, chicken, chain, cherries
32. shake	shoe, spade, shovel, shirt
33. true	truck, tree, trick, bridge
34. spell	spoon, spider, butterfly, spring
35. stamp	stairs, chimney, rose, star

Rhymes

36. wing	swing, king, string, pin
37. run	sun, car, bun, gun
38. sat	hat, peas, bat, dot
39. man	pan, pig, fan, can
40. grand	hand, band, snowman, boot

AUDITORY DISCRIMINATION TEST**Third Form****DIRECTIONS FOR ADMINISTERING**

THE UNIVERSITY OF CHICAGO
LIBRARY
540 EAST 57TH STREET
CHICAGO, ILL. 60637

GROUP TEST FOR AUDITORY DISCRIMINATION
FOR
GRADE I

Helen A. Murphy
Rhode Island College of Education

Name	School	Age	Grade
Date			
Date of birth			

Score

Beginning consonants _____

Beginning blends _____

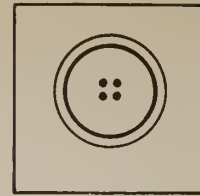
Final consonants _____

Rhymes _____

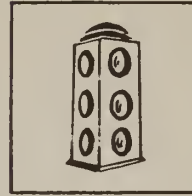
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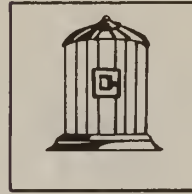
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2



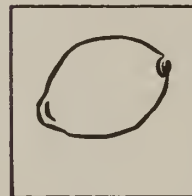
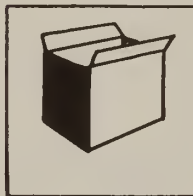
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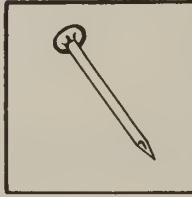
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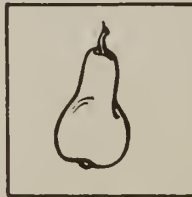
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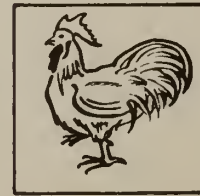
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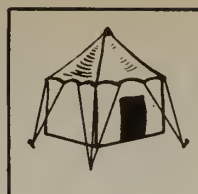
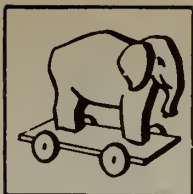
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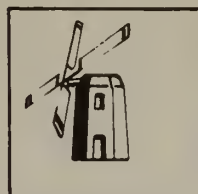
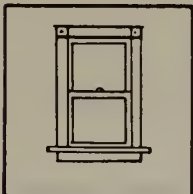
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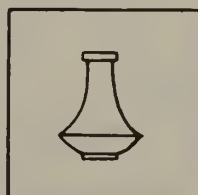
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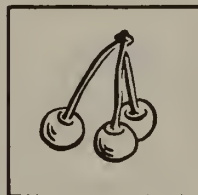
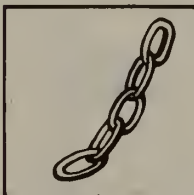
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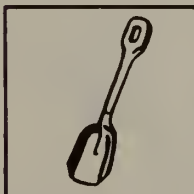
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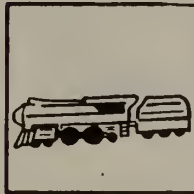
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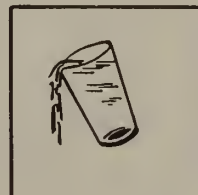
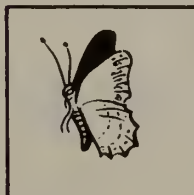
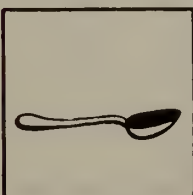
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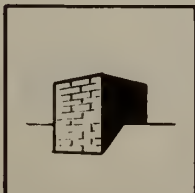
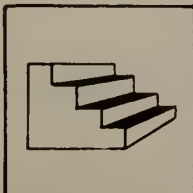
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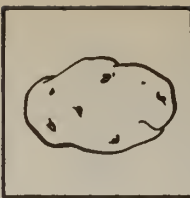
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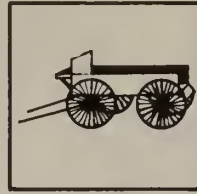
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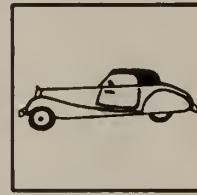
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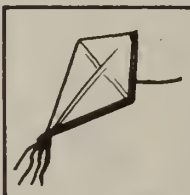
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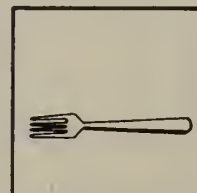
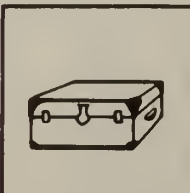
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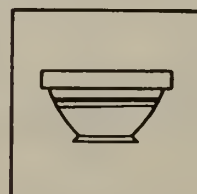
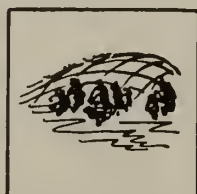
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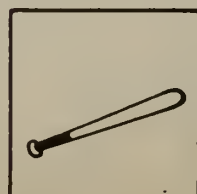
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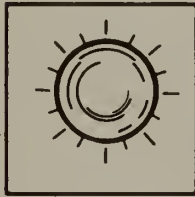
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1



2



3



4



5



DIRECTIONS FOR ADMINISTERING AUDITORY TEST

Each child needs a copy of the test and a pencil.

Preliminary Exercise

"We are going to play a game today using our ears and our eyes. We are going to listen and watch very carefully. Listen! What sound does the engine of a train make? What sound does the wind make? What sound does an airplane make? What sound does a drum make? Listen! F, f, f, f, f, f. I'm going to say some words that begin with "f". You say them after me." Dictate: for, fat, fire, from, fix.

"Now open your books and fold the page back so that you can see these pictures--a bird, a ball, a basket, and a boy." Check to be sure each child has the correct page. "We are going to mark some of these pictures, but not all of them. We shall work together. Listen very carefully. Look at the picture of the bird. Listen carefully. Beet, bird. Does bird sound like beet at the beginning? Yes. Mark it like this (illustrating). Listen again. Beet, ball. Does ball sound like beet at the beginning? Mark it." Continue the same way with the other two words in the line. Check carefully to be sure all are following the directions.

"Now look at the next line! We are going to mark the things in this line that begin like cake. Listen! Cake, candle. Does candle sound like cake at the beginning? Yes, so we shall mark the candle. Listen! Cake, cat. Shall we mark the cat? Yes, mark the cat. Listen! Cake, man. Does man sound like cake at the beginning? No. We won't mark man."

"Look at the next line. This time we shall mark the things that begin like dance. Listen! Dance, dog. Do they sound alike at the beginning? Yes. So, we shall mark the dog. Listen! Dance, door. Do they sound alike at the beginning? Yes, and we'll mark the door. Listen carefully! Dance, table. Will you mark the table? No. Listen! Dance, duck. Will you mark the duck? Yes, mark the duck."

"Look at the next line. We are going to mark the things in this line that begin like father. Listen! Father, football. Does football begin like father? Yes, mark the football. Listen carefully! Father, canoe. Will you mark the canoe? No. Listen again. Father, fish. Will you mark the fish? Yes, mark the fish. Listen! Father, key. Will you mark the key? No."

"Look at the whole page. Did you mark every picture? No. Did you mark three pictures in every line? No. Sometimes we mark four pictures in a line, sometimes we mark two, and sometimes we mark three."

"Turn your page and find the picture of the garden. We are going to do this whole page and I'm not going to help you any more. Be sure to listen carefully and mark only the pictures with names like the words I say. Listen carefully and watch the pictures." Give no more help. Say the word each time before the name of the picture.

Page 1. Beginning sounds.

- Row 1. go--garden, goat, gate, button
- " 2. hammer--hat, book, signal, house
- " 3. jello--jumprope, jack-o-lantern, cage, jug
- " 4. like--ladder, telephone, leaf, lady
- " 5. mother--mouse, box, lemon, moon
- " 6. name--next, night, nail, broom
- " 7. paint--pail, Santa, pear, pencil
- " 8. red--rake, rabbit, flower, rooster
- " 9. sing--sailboat, saw, balloon, cap

Page 2. Beginning sounds.

- Row 1. take--toy, toothbrush, daisy, tent
- " 2. wait--window, horse, cow, windmill
- " 3. very--violin, umbrella, vegetables, vase
- " 4. chop--chair, chicken, chain, cherries
- " 5. shake--shoe, sled, shovel, ship
- " 6. true--truck, tree, train, broken
- " 7. spell--spoon, spider, butterfly, spill
- " 8. stamp--stairs, chimney, rose, star
- " 9. Practice row for final sound. Work together.
farm--arm, dress, barn, drum.

"Now we are going to mark the ones that sound alike at the end. Listen carefully."

Page 3. Final sounds.

- Row 1. early--candy, potato, cooky, turkey
- " 2. farm--horn, clown, wagon, pipe
- " 3. start--carrot, plant, bread, car
- " 4. dog--bag, flag, tub, rug
- " 5. crowd--bed, kite, bud, road
- " 6. grass--grapes, scissors, hoe, duck
- " 7. trick--clock, truck, tractor, fork
- " 8. girl--squirrel, lock, hill, bowl
- " 9. peep--cup, lamp, face, bat

Page 4. Final sounds.

- Row 1. wing--swing, king, string, pin
- " 2. run--sun, ear, bun, gun
- " 3. sat--mat, peas, bat, nut
- " 4. man--pan, pig, fan, can
- " 5. grand--hand, band, swim, boot

APPENDIX B
STANDARD TESTS

DETROIT

BEGINNING FIRST-GRADE INTELLIGENCE TEST

(Revised)

By ANNA M. ENGEL, Assistant Director, Special Education, Detroit Public Schools,
and HARRY J. BAKER, Director, Psychological Clinic, Detroit Public Schools

Last name..... First name..... Initial... Sex: M...F...
 City..... School..... Birth date.....
 Rating..... Mental Age..... IQ.....

No. OF TEST	SCORE
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Total	

EXAMINATION: FORM A

A

Test 1



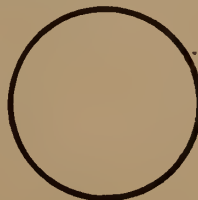
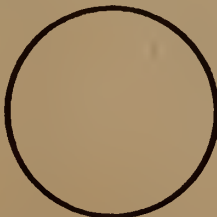
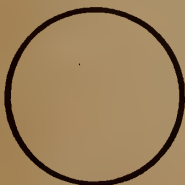
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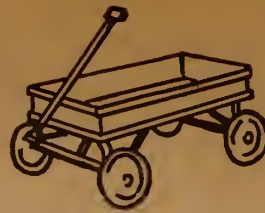
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Score: Test 1

A

Test 2



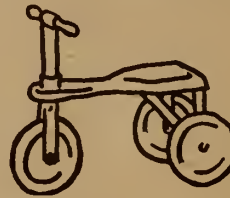
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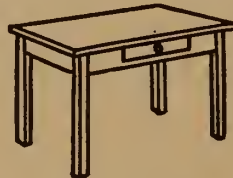
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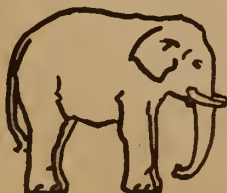
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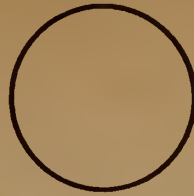


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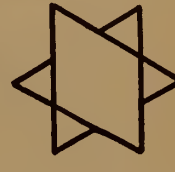
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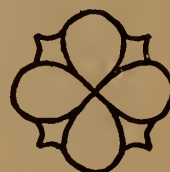
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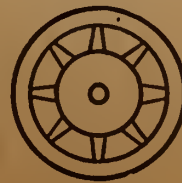
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6



7



A

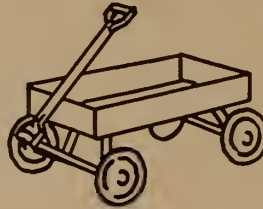
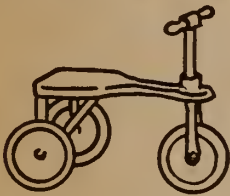
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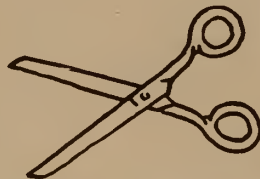
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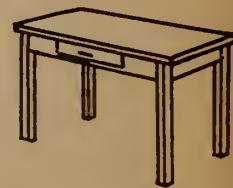
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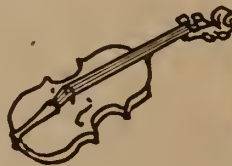
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4



5



6



7



Test 5

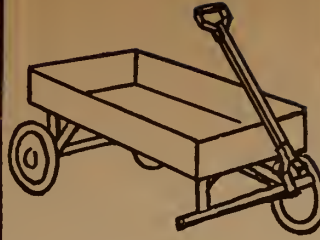
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2



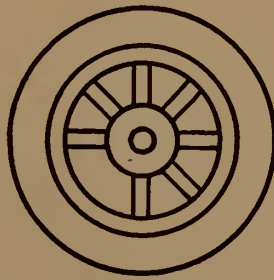
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4



5



6



7



Score

Test 6

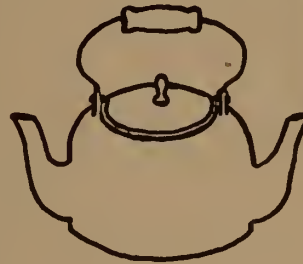
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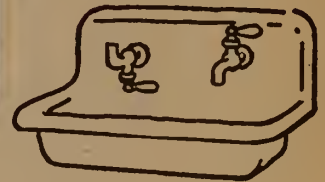
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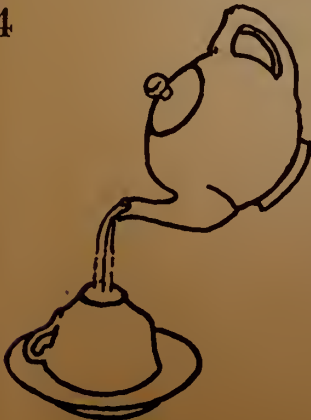
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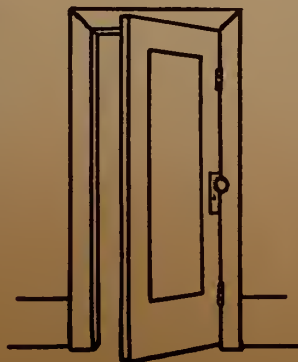
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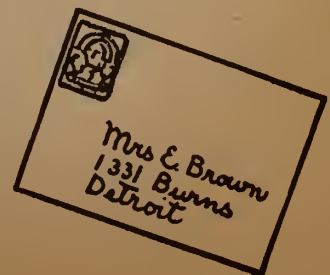
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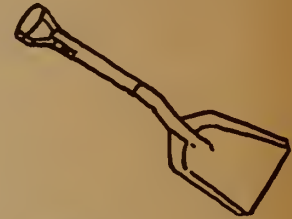
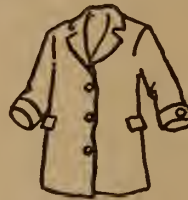
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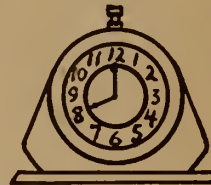
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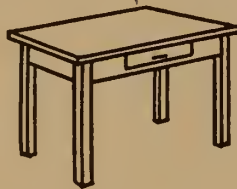
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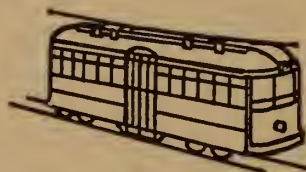
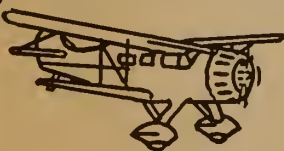
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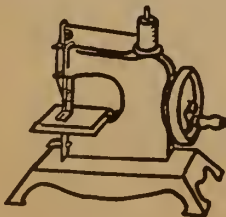
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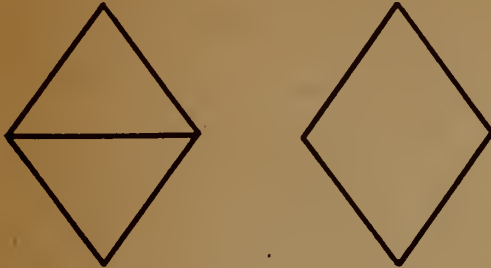


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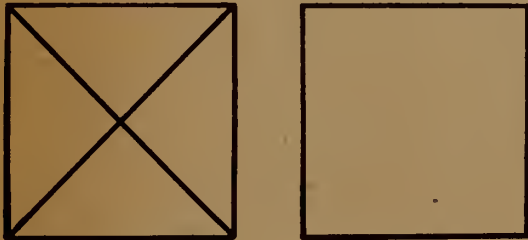
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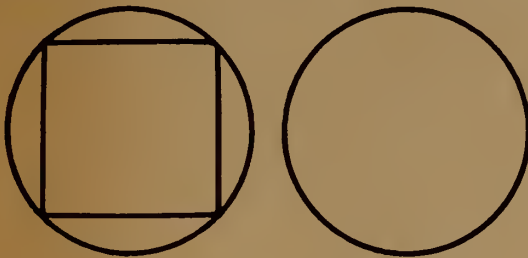
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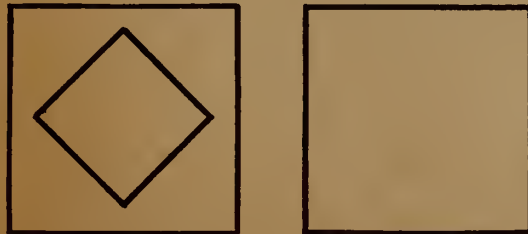
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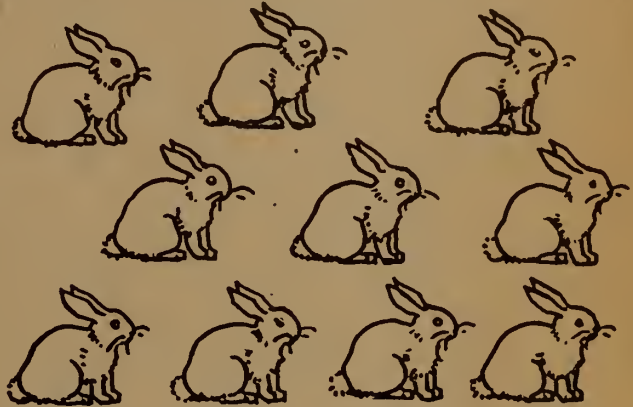
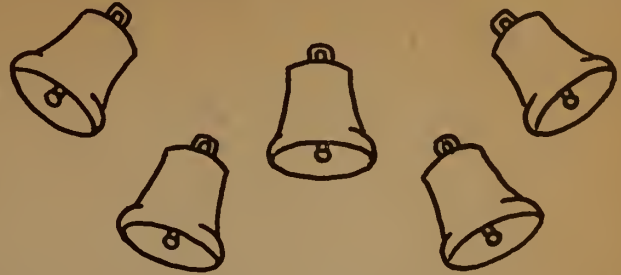


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Score [7]

Test 9



Score

Test 10

A



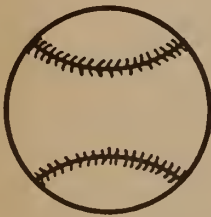
1



2



3



4



5



PINTNER GENERAL ABILITY TESTS: VERBAL SERIES

Pintner-Cunningham Primary Test: Form B

Chron. Age	
Mental Age	
IQ	

By **RUDOLF PINTNER, Ph.D.**
 Professor of Educational Psychology, Teachers College, Columbia University

BESS V. CUNNINGHAM, Ph.D.
 Professor of Education, University of Toledo

and **WALTER N. DUROST, Ph.D.**
 Formerly Research Associate, Institute of School Experimentation
 Teachers College, Columbia University

Prim.
B
 (Verbal)

For Kindergarten and First and Second Grades

Name.....

Age..... years..... months. Date of birth.....

Grade..... Teacher.....

Date of test..... 19..... Examiner.....

School.....

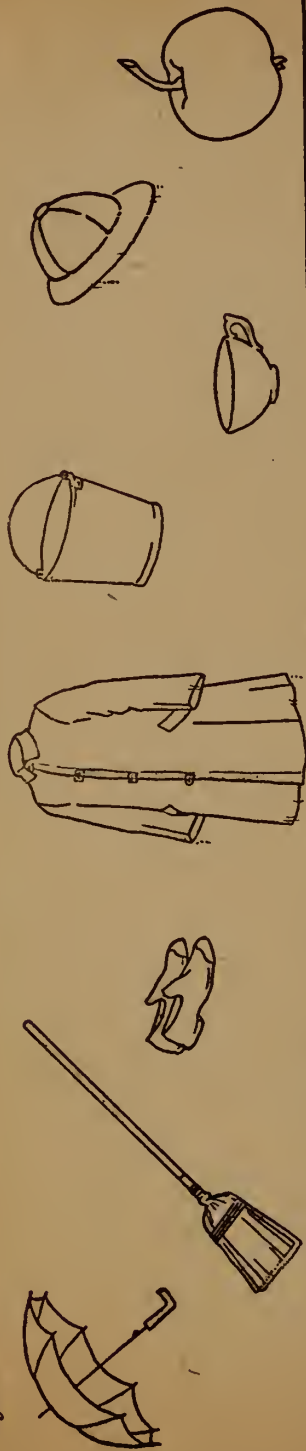
City..... State.....

Test	Score
1	
2	
3	
4	
5	
6	
7	
Total	

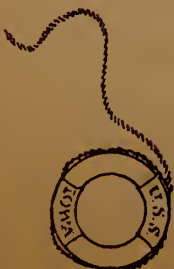
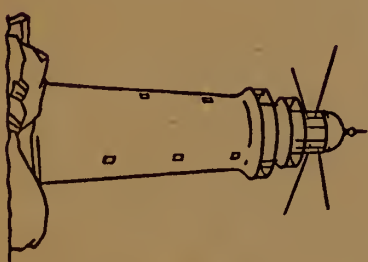
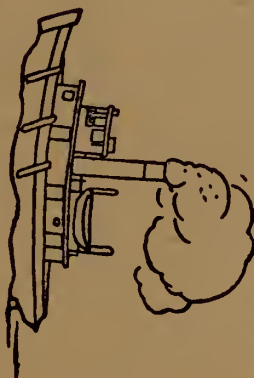
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TEST 1



TEST 1 — Continued



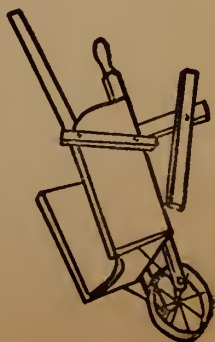
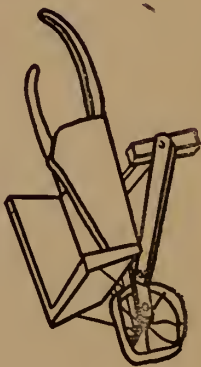
Total number right.....

Total number wrong.....

Score ($\frac{R-W}{2}$).....

Score.....

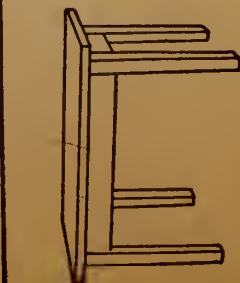
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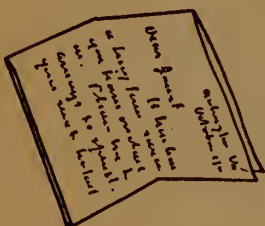
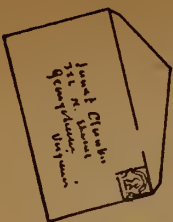
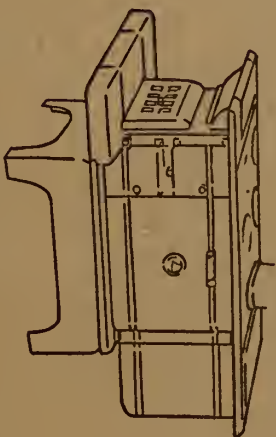
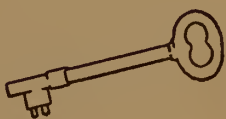
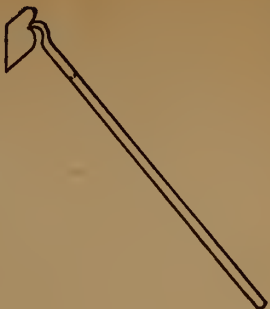
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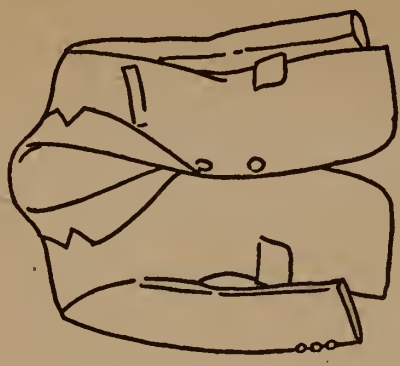
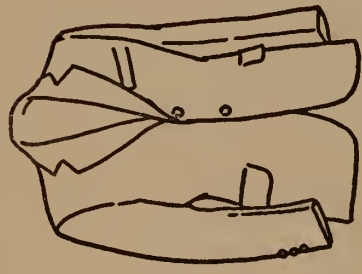
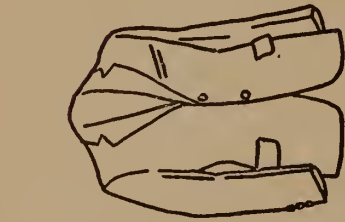


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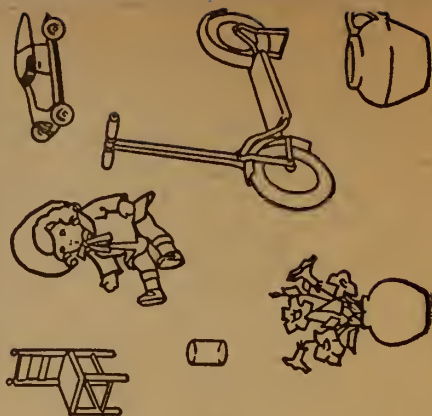
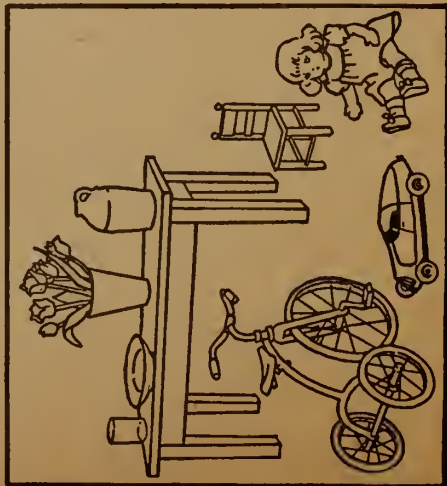
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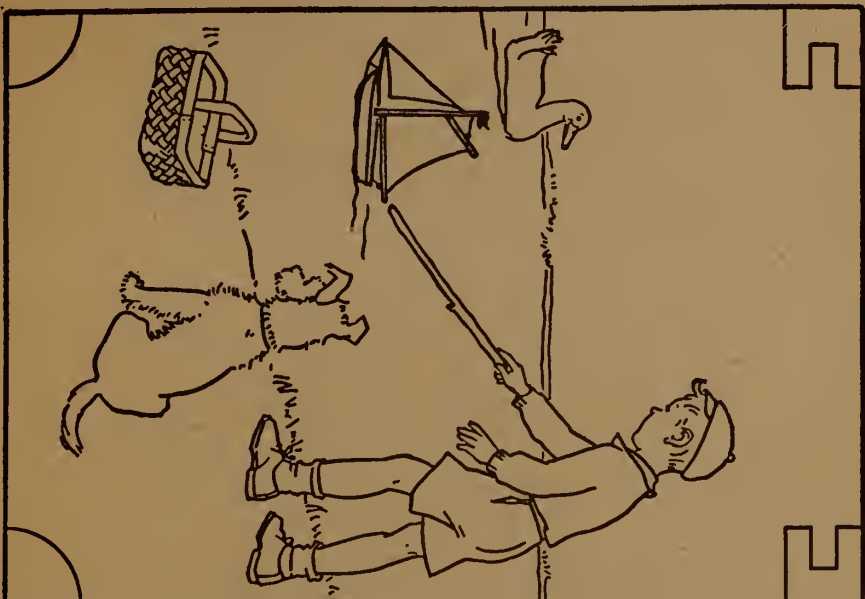


TEST 5





TEST 5 — Continued

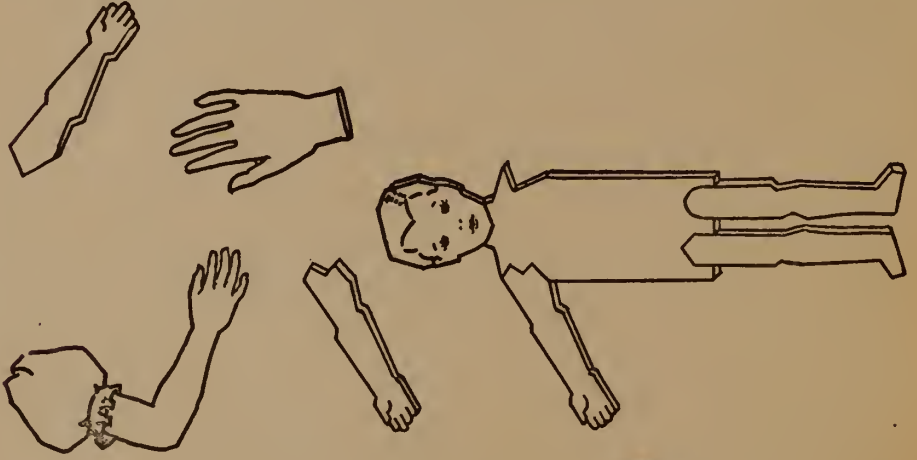
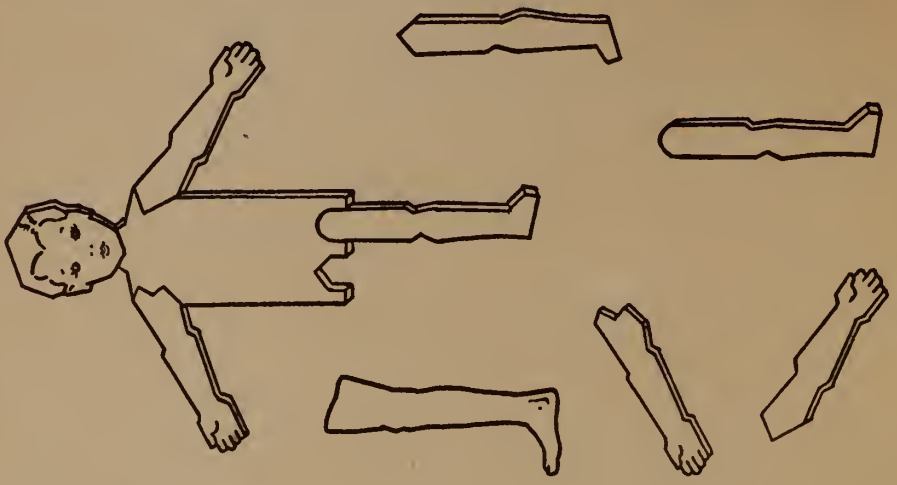


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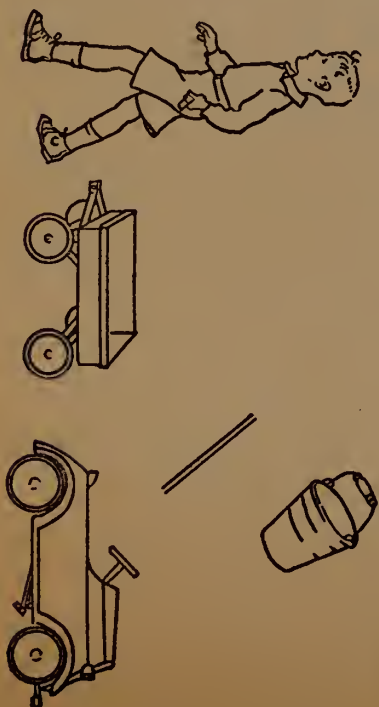
Total number wrong.....

Score ($\frac{R-W}{S}$).....

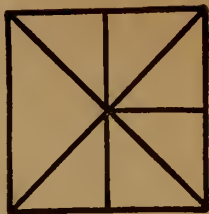
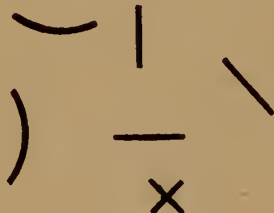
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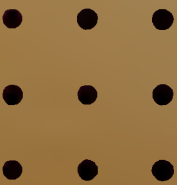
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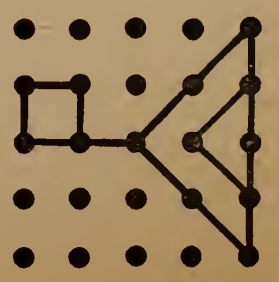
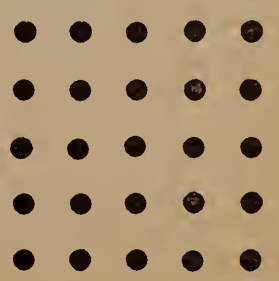
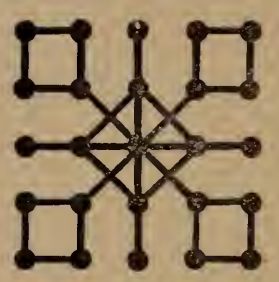
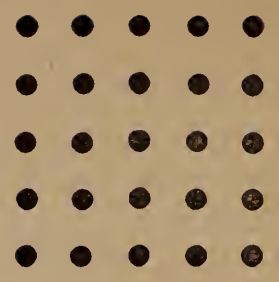
TEST 6 — Continued



TEST 7



TEST 7 — Continued





Total Score

Rating

LEE-CLARK READING READINESS TEST

Devised by J. Murray Lee, Dean of Education, Washington State College, and Willis W. Clark, Director of Research and Guidance, Los Angeles County Schools.

Name Robert Fimm

School _____ Age _____

City _____ Date _____

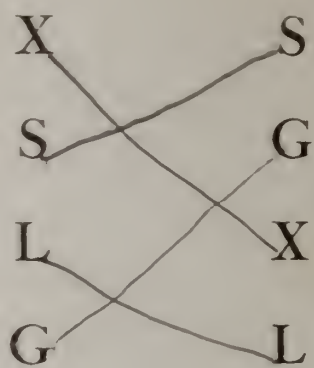
PUPIL'S RECORD

	Possible Score	Pupil's Score	Rating
Test 1. Matching	12	12	
Test 2. Matching	12	9	
Test 3. Cross Out	12	11	
Test 4. Cross Out	14	7	
Total	50	38	

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SAMPLE

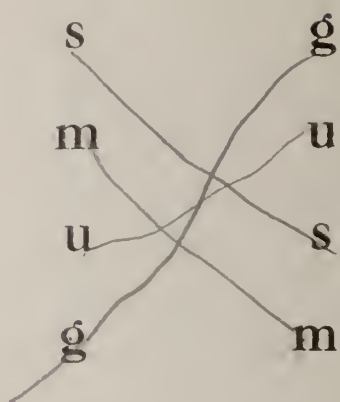


TEST 1. MATCHING

X	O	✓
O	V	✓
C	X	✓
A	W	✓
V	A	✓
W	C	✓
P	T	✓
T	U	✓
J	P	✓
U	Q	✓
Z	J	✓
Q	Z	✓

12

SAMPLE



TEST 2. MATCHING

s	a	✓
w	s	✓
a	y	
z	w	✓
t	z	✓
y	e	✓
e	i	✓
n	t	
f	n	✓
i	b	✓
d	f	
b	d	✓

9

X	X	R	X
S	A	S	S
L	L	L	W
G	G	M	G

TEST 3. CROSS OUT

S	S	S	E	✓
I	D	I	I	✓
H	H	E	H	✓
S	F	F	F	✓
M	M	M	R	✓
N	N	A	N	✓
E	F	E	E	
K	K	K	R	✓
H	Y	Y	Y	✓
R	B	R	R	
B	D	D	D	✓
B	B	D	B	✓

10

TEST 4. CROSS OUT

SAMPLE

a m
f u n
g e t
c a k e

a m ~~d~~
f u ~~t~~ n
g e ~~t~~
c a ~~k~~ e

i t
m e
d o
c a n
d r y
p i e
w a y
d i p
b e a r
t e l l

i t ~~d~~ ✓
m ~~e~~ ✓
~~d~~ o ✓
c ~~d~~ a ~~t~~
d r ~~m~~ y ✓
p i e ~~t~~ ✓
w a ~~k~~ y ✓
d i ~~q~~ ~~p~~
b e ~~k~~ a r ✓
t e l f ~~f~~

n i c e
w h e r e
t h a n k
h o u s e

n m i ~~e~~
w h e r n e
t l h a n k
h o u s e s

7



1	1000
2	2000
3	3000
4	4000
5	5000
6	6000
7	7000
8	8000
9	9000
10	10000
11	11000
12	12000
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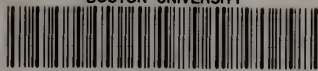
1. The first part of the paper is devoted to a discussion of the general principles of the theory of the structure of the atom. It is shown that the structure of the atom is determined by the laws of quantum mechanics, which are based on the principle of the uncertainty of the position and momentum of the particles.

2. In the second part of the paper, the author discusses the problem of the structure of the nucleus. It is shown that the structure of the nucleus is determined by the laws of quantum mechanics, which are based on the principle of the uncertainty of the position and momentum of the particles.

3. The third part of the paper is devoted to a discussion of the problem of the structure of the molecule. It is shown that the structure of the molecule is determined by the laws of quantum mechanics, which are based on the principle of the uncertainty of the position and momentum of the particles.

4. The fourth part of the paper is devoted to a discussion of the problem of the structure of the crystal. It is shown that the structure of the crystal is determined by the laws of quantum mechanics, which are based on the principle of the uncertainty of the position and momentum of the particles.

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